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Research Note

First Report of *Ostertagia leptospicularis* (Nematoda: Trichostrongyloidea) in Calves (*Bos taurus*) from North America[1]

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ABSTRACT: Specimens of *Ostertagia leptospicularis* were recovered from abomasa of 17 of 23 naturally infected calves in Oregon. Also present were: *Ostertagia kolchida, Ostertagia lyrata,* and *Ostertagia ostertagi.* The co-occurrence of specific pairs of species (*O. leptospicularis: O. kolchida,* and *O. ostertagi: O. lyrata*) supports the hypothesis of polymorphic species pairs within the Ostertagiinae. This is the first report of *O. leptospicularis* and the second of *O. kolchida* in cattle from North America.

KEY WORDS: Oregon, *Ostertagia leptospicularis,* Nematoda

Ostertagia leptospicularis Asadov, 1953, is a common abomasal parasite of members of the Cervidae and has been found in the abomasum of other sylvatic and domestic ruminants. The known geographic range of *O. leptospicularis* has until recently been confined to the Palearctic region and New Zealand where it is considered to be fairly common in cervids and less common in cattle. Common hosts include elk, *Cervus elaphus* (Jansen, 1960; Drozdz, 1966; Kutzer and Hinaidy, 1969; Dunn, 1983), moose, *Alces alces* (Drozdz, 1966; Nilsson, 1971), sika deer, *Cervus nippon* (Drozdz, 1966), fallow deer, *Cervus dama* (Swierstra et al., 1959; Drozdz, 1966), roe deer, *Capreolus capreolus* (Swierstra et al., 1959; Dunn, 1965; Drozdz, 1966; Kutzer and Hinaidy, 1969; Nilsson, 1971; Andrews et al., 1974; Drozdz et al., 1987), chamois, *Rupricapra rupricapra* (Kutzer and Hinaidy, 1969), caribou, *Rangifer tarandus* (Freutel and Lankester, 1989), cattle, *Bos taurus* (Rose, 1963, 1968; Hinaidy et al., 1972), and sheep, *Ovis aries* (Swierstra et al., 1959; Nilsson, 1971).

The data presented in this report support the hypothesis of polymorphism suggested by Lancaster and Hong (1981). A report by Lichtenfels et al. (1988) also supports this hypothesis and provides a redescription of 7 species of the Ostertagiinae that are considered to be polymorphs of only 3 species, with each species pair being morphological variants of a single species. Between each polymorphic species pair, the major and minor species are usually found together, with 1 partner always dominant. An exception to this was reported by Rickard and Zimmerman (1986) when *O. kolchida* was discovered in the absence of its major species, *O. leptospicularis.*

The recovery of *O. leptospicularis* and *O. kolchida* during the present study represents the first report of *O. leptospicularis,* and the second of *O. kolchida,* from cattle in North America. The first report of *O. kolchida* from North America was by Rickard and Zimmerman (1986) in cattle from Oregon. Freutel and Lankester (1989) reported the recovery of *O. leptospicularis* from captive caribou at the Kakabeka Falls Game Farm, Canada, representing the first report from North America. Lichtenfels et al. (1988) listed *O. leptospicularis* from California cattle in a table of specimens studied, but we have learned (Lichtenfels, pers. comm.) that the item was a typo-

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Table 1. Intensity and prevalence of species of *Ostertagia* nematodes* recovered from Oregon calves (*Bos taurus*).

Species	Mean number per infected host		Prevalence (%)	
	Control	Treated	Control	Treated
O. ostertagi	5,620	4,187	100	100
O. lyrata	16	22	55	50
O. leptospicularis	98	88	73	75
O. kolchida	4	2	18	8

* Male specimens only.

Table 2. Morphometrics of male specimens of *Ostertagia leptospicularis* recovered from Oregon calves (*Bos taurus*).

Character	Number of specimens measured	Ranges (mean) in μm
Body length	82	4,750–6,833 (5,817)
Esophagus length	82	617–864 (779)
Esophagus width at base	78	27–59 (43)
Esophageal–intestinal valve length	82	74–167 (118)
Cervical papillae*	82	179–387 (298)
Excretory pore*	82	154–370 (283)
Width of body†	79	67–163 (96)
Sub-ventral gland orifices*	77	189–380 (296)
Spicule length	79	137–195 (159)
Trifurcation of spicule tips‡	77	97–147 (118)
Length of gubernaculum	70	13–48 (29)
Width of gubernaculum	71	4–13 (7)
Sjoberg's organ	82	absent
Bursal ray pattern§	82	2-1-2

* Distance measured from anterior end.
† Distance measured at pre-bursal papillae.
‡ Distance measured from anterior end of spicules.
§ Pattern following system of Durette-Desset (1983).

graphical error, and no specimens of *O. leptospicularis* from North American cattle were included in that study. Since these reports, *O. leptospicularis* has again been collected from cattle in Oregon (Rickard, pers. comm.) and most recently from Montana (Decker and Mulrooney, unpubl. data).

During a routine anthelmintic efficacy trial, several specimens of *Ostertagia leptospicularis* were recovered. The trial was conducted early in the summer of 1988 at Oregon State University. Calves (*Bos taurus*) of mixed breed (less than 12 months of age), harboring naturally acquired gastrointestinal nematodes, were transported from the ranch of origin in Molalla, Oregon, to pastures located at the Berry Creek Beef Ranch of the Oregon State University Department of Animal Science, Corvallis, Oregon. A total of 23 animals was used for the study and was divided into 2 groups (11 in the nontreated, control group and 12 in the treated group). The treated animals were provided with free-choice medicated mineral mix (morantel tartrate), while nonmedicated mineral mix was available free-choice for the control animals. The quantity of mineral mix consumed by each individual animal is unknown. The 2 groups of animals were kept on separate pastures for a total of 63 days, then necropsied for recovery and identification of gastrointestinal nematodes present.

Based on the identification of male nematode specimens, 4 species of *Ostertagia* were identified: *O. ostertagi, O. lyrata, O. kolchida,* and *O. leptospicularis. Ostertagia leptospicularis* was recovered from 17 of the 23 cattle (8 nontreated, control animals and 9 treated animals). Intensity of *Ostertagia* species for each group of calves is presented in Table 1.

The mean values for the ratios of polymorphic species pairs were 99.7% *O. ostertagi*: 0.3% *O. lyrata* and 96.1% *O. leptospicularis*: 3.9% *O. kolchida* for the nontreated group of animals. From the group that received the medicated mineral mix, the mean values were 99.5% *O. ostertagi*: 0.5% *O. lyrata* and 97.8% *O. leptospicularis*: 2.2% *O. kolchida.* Of the polymorphic species pairs, *O. leptospicularis* and *O. ostertagi* are the dominant species, whereas *O. kolchida* and *O. lyrata* comprise the minor species, respectively. Morphological measurements of the specimens identified as *O. leptospicularis* were taken from approximately 80 male specimens (Table 2) and compared very well to those reported by Lichtenfels et al. (1988). By ANOVA, no statistical differences ($P > 0.05$) were observed in measurements between the treated and control groups of animals. Several specimens of *O. leptospicularis* have been deposited with the United States National Museum (USNM), Helminth Collection Nos. 81033 and 81034.

The mode of introduction and geographic distribution of *O. leptospicularis* in domestic ruminants in North America has yet to be determined. This species may have been: (1) present in North America but not previously recognized; (2) brought into the United States recently with animals imported form an area where *O. leptospicularis* is endemic; or (3) introduced by direct

interchange of parasites between sylvatic and domestic hosts, being cervids and cattle in this case. The range of origin in the present study is populated by black-tailed deer (*Odocoileus hemionis*) and occasionally utilized by elk (*Cervus elaphus*), which could account for direct interchange of parasites between these sylvatic cervids and cattle. The exchange of parasites between sylvatic and domestic hosts has been previously suggested by reports of the common deer parasites *Ostertagia kolchida* (Rickard and Zimmerman, 1986) and *Oesophagostomum venulosum* (Hoberg et al., 1988) in cattle from Oregon.

Ostertagia leptospicularis is considered to be highly pathogenic to cattle (Al Saqur et al., 1980, 1982a, b, 1984; Bisset et al., 1984; Sulger Buel et al., 1984) and could be considered as a potential threat to the livestock industry.

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